## Dental Applications for Polypeptide Nano-Structures for antimicrobial composite resin filling (Ramot)

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### The Technology

Novel, self-assembled organic aromatic nano-peptides and nano-spheres which exhibit excellent properties such as stability, solubility, transparency and rigidness alongside basic peptide features. Nanotechnology benefits are achieved with biocompatible ingredients having a non-toxic fabrication process.

The nano-material can be prepared as powder or hydrogels and be easily mixed with common dental materials.

### The Need

Composite resin fillings are the most common alternative to dental amalgam. They are sometimes called “tooth-colored” or “white” fillings because of their color. The advantage of choosing composite resin is the aesthetic parameter – the filling blends in with the surrounding tooth. However, their significant disadvantage is the reduced durability requiring more frequent replacement.

Our technology of reinforcement with nano-peptides offers the mechanical support to composite resins as well. Such improvement can be achieved by integration of merely a small percentage of the proprietary peptide nano-structures into the resins. These peptide nano-spheres and nano-tubes are extremely rigid (on the scale of common metals used for dentistry), and we've already demonstrated significant improvement of mechanical properties to other composites with this technology.

Encapsulation of active ingredients such as fluoride and chlorhexidine by these nanostructures and/or hydrogel can also provide a slow release mechanism, avoiding high doses and allowing for long term protection with a single treatment.

### Potential Applications

Reinforcement of Composite Resin Dental Fillings
Primor for Dental Fillings
Reinforcement of Dental Adhesives
Encapsulation of active ingredients for toothpaste, mouthwash and whitening products.
Increase of surface area and activity of teeth whitening strips.
Mechanical improvement of tooth brush bristles.

### Stage of Development

The fabrication process is currently optimized for preparation of research-required quantities and for feasibility testing amounts. There are known models for efficient scale up of manufacturing and potential partners for leading this effort.

### Patents

Three granted patents and three additional patent applications in different stages. Various licensing models are available.

**Supporting Publications**

Self-Assembled Fmoc-Peptides as a Platform for the Formation of Nanostructures and Hydrogels; Biomacromolecules, Volume 10, Issue 9, August 25, 2009; R. Orbach, L. Adler-Abramovich, S. Zigerson, I. Mironi-Harpaz, D. Seliktar, and E. Gazit.
Self-Assembled Organic Nanostructures with Metallic-Like Stiffness, Angewandte Chemie, Volume 122, Issue 51, December 17, 2010; L. Adler-Abramovich, N. Kol, I. Yanai, D Barlam, R.Z. Shneck, E. Gazit and I. Rousso.
Improvement of the Mechanical Properties of Epoxy by Peptide Nanotube Fillers, SMALL, Volume 7, Issue 7, April 4, 2011; N. Even, L. Adler-Abramovich, L. Buzhansky, H. Dodiuk and E. Gazit.

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